

A person wearing a light-colored long-sleeved shirt and a tan baseball cap is seen from behind, holding a smartphone up to take a photograph of a lush green forest. The forest extends to a distant mountain range under a bright blue sky with scattered white clouds. The scene is framed by dark green trees in the foreground.

# GLOBE Clouds: Countdown to 1 Million Satellite Matches

Marilé Colón Robles, NASA LaRC/SSAI





# Global Learning and Observations to Benefit the Environment (GLOBE)

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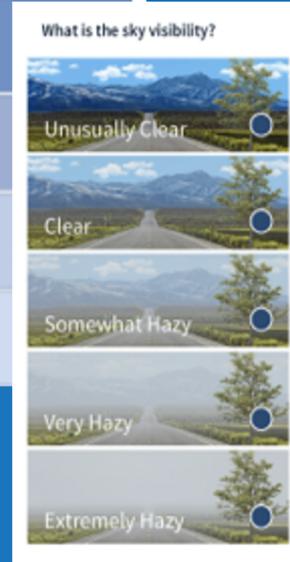
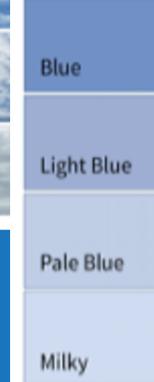
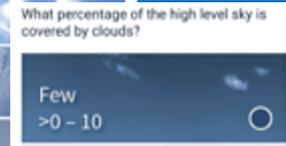
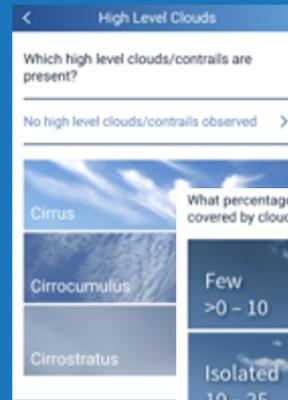


# Clouds Tool



## Steps to observe:

- Overall cloud cover
- Sky conditions
- Cloud types, cloud cover, and opacity by height
- Take photos

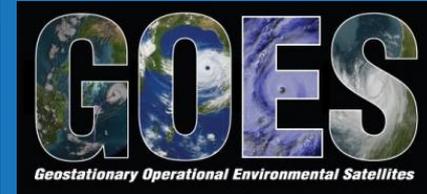
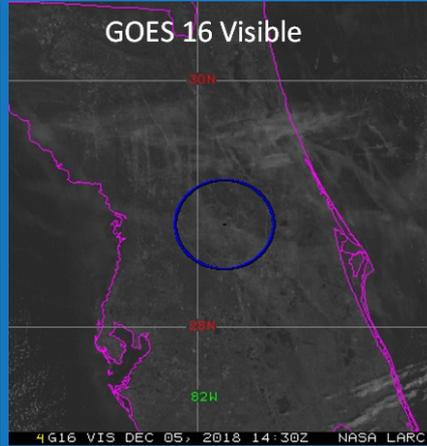


<https://observer.globe.gov/>

# Cloud Observations Matched to Satellite Data



NASA Cloud Observation and Satellite Match			
Satellite	GEO	Aqua	Your Observation
Universal Date/Time 2020-05-07	18:03	18:01	18:03
Latitude Range	38.69 to 39.33	38.62 to 39.42	Latitude 29.010300
Longitude Range	-77.2 to -76.56	-77.26 to -76.45	Longitude -76.875700
Total Cloud Cover	Few 2.92% <input type="radio"/>	Few 1.48% <input type="radio"/>	No Clouds Observed <input type="radio"/>
H I G H	Cloud Cover	No Clouds <input type="radio"/>	No Clouds Observed <input type="radio"/>
	Cloud Altitude		
	Cloud Phase		
	Cloud Opacity		
M I D	Cloud Cover	No Clouds <input type="radio"/>	No Clouds Observed <input type="radio"/>
	Cloud Altitude		
	Cloud Phase		
	Cloud Opacity		
L O W	Cloud Cover	Few (2.92%) <input type="radio"/>	No Clouds Observed <input type="radio"/>
	Cloud Altitude	0.19 (km)	1.24 (km)
	Cloud Phase	Water 302.76 (K)	Water 276.31 (K)
	Cloud Opacity	Transparent	Transparent
		Sky Visibility: Clear Sky Color: Blue	
Corresponding NASA Satellite Images. Click to view image -->		North East South West Up Down	
<a href="#">GOES-16 Visible</a> <a href="#">Infrared</a> <a href="#">GEO Tutorial</a>		<a href="#">MODIS Rapid Response</a> <a href="#">Wordpress</a>	
Are there any comments you would like to add? Be sure to add the name of the satellite for our record.			
<input type="text"/>			
<input type="button" value="Submit Comment"/>			
		<b>Surface Conditions</b> Snow/Ice No Standing Water No Muddy Yes Dry Ground No Leaves on Trees Yes Raining or Snowing No	



**CALIPSO**  
 Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation

Observing the vertical structure of clouds and aerosol layers

Search: Satby ID: 4001-03-0000  
 www.nasa.gov

2010 Pinatubo (Taal) Volcanic Plume - photo 000 view: western Canada - April 11, 2010  
 www.nasa.gov



GLOBE Clouds team sends ~3-5 thousand emails per month to the citizen science community.

# Research Paper Accepted

**Title:** Do citizen science Intense Observation Periods increase data usability? A deep dive of the NASA GLOBE Clouds data set with satellite comparisons

**AGU Earth and Space Science**



**Led by Brant Dodson**

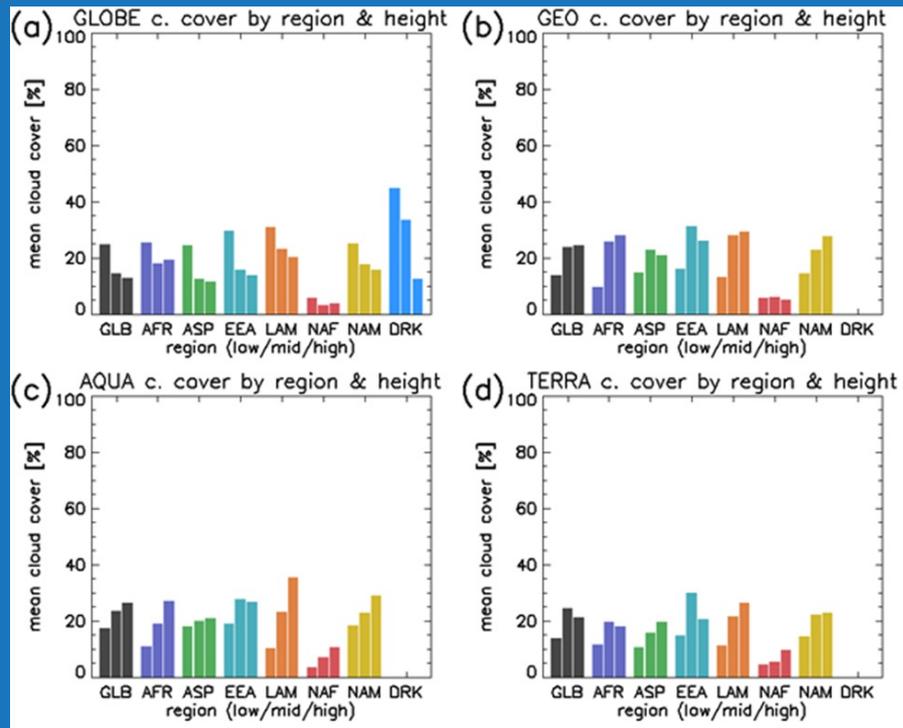


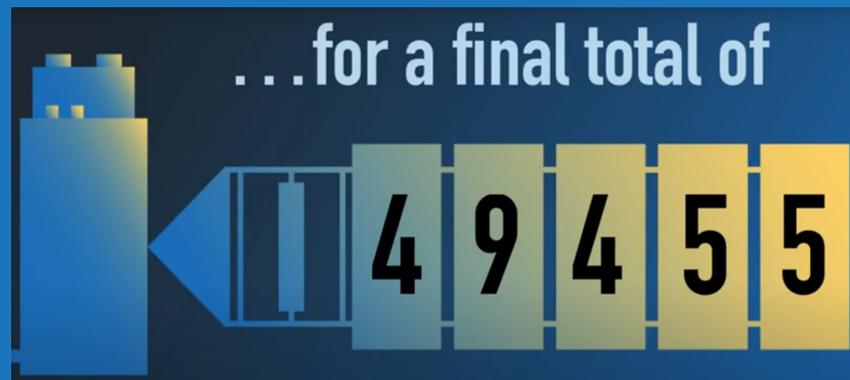
Figure 4. Mean cloud cover by altitude and region for the combined SCC18 and FCC19 datasets. (a) is from GLOBE citizen scientist reports, (b) is from collocated geostationary satellite cloud retrievals, (c) is from Aqua, and (d) is from Terra. The three bars for each region represent the mean cloud cover for each altitude; left to right is low, middle, and high clouds.

# Cloud Challenge 2022: Clouds in a Changing Climate



January 15 – February 15, 2022

- 42,703 ground-cloud observations
- Over 3,600 participants
- 89 countries on all 7 continents
- 49,455 satellite matches



# NASA GLOBE CLOUD GAZE – Since April 2021



- New citizen science project funded through NASA's CSESP in collaboration with the Zooniverse online citizen science platform.
- Analyzing GLOBE Cloud sky photographs identify cloud cover and cloud types.
- Over 200,000 photographs tagged with geolocated ground-cloud reports and satellite data.



PI -  
Marilé  
Colón  
Robles

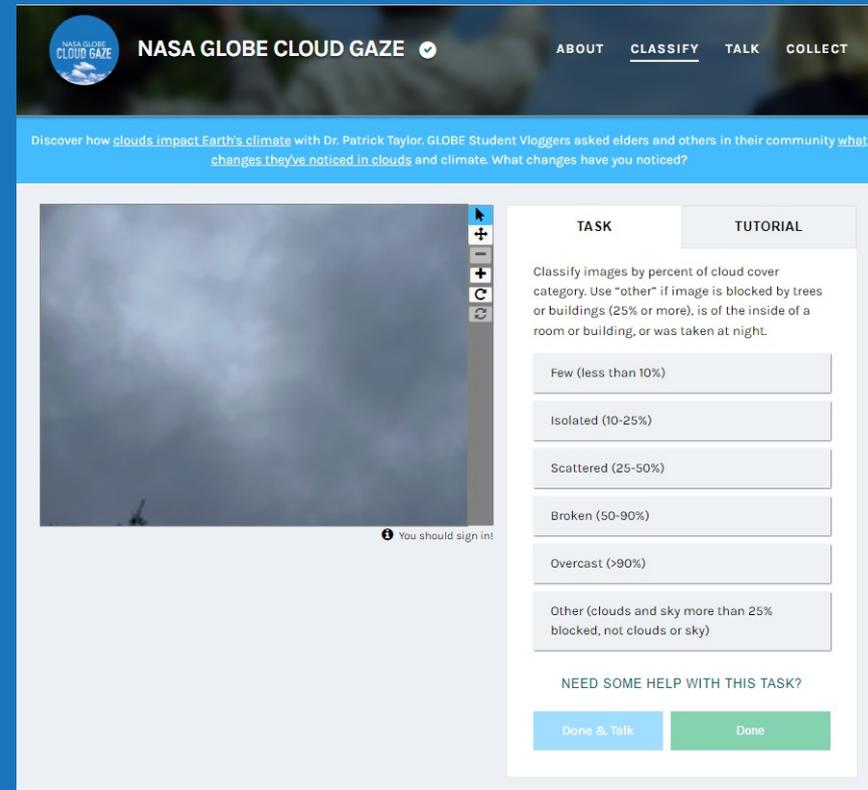


CoPI &  
Data  
Manager -  
Tina  
Rogerson

<https://www.zooniverse.org/projects/nasa-globe/nasa-globe-cloud-gaze>

# NASA GLOBE CLOUD GAZE

- Average of 15,000 classifications per day.
- Most active project on Zooniverse across all disciplines.
- Tags per image of cloud mass and cloud type.
- July 2022 – submission of **Phase 2 of proposal**: collaborations with U. of Vermont & U. of Maryland to use images in **AI/ML work and developing cloud type climatologies.**



The screenshot displays the NASA GLOBE Cloud Gaze web interface. At the top, there is a navigation bar with the project logo, the title "NASA GLOBE CLOUD GAZE", and links for "ABOUT", "CLASSIFY", "TALK", and "COLLECT". Below the navigation bar, a blue banner contains the text: "Discover how clouds impact Earth's climate with Dr. Patrick Taylor. GLOBE Student Vloggers asked elders and others in their community what changes they've noticed in clouds and climate. What changes have you noticed?". The main content area features a large image of a cloudy sky. To the right of the image is a vertical toolbar with icons for zooming in (+), zooming out (-), and refreshing (C). Below the image, a small message reads "You should sign in!". To the right of the image is a classification panel with two tabs: "TASK" and "TUTORIAL". The "TASK" tab is active, showing the instruction: "Classify images by percent of cloud cover category. Use 'other' if image is blocked by trees or buildings (25% or more), is of the inside of a room or building, or was taken at night." Below the instruction are six radio button options: "Few (less than 10%)", "Isolated (10-25%)", "Scattered (25-50%)", "Broken (50-90%)", "Overcast (>90%)", and "Other (clouds and sky more than 25% blocked, not clouds or sky)". At the bottom of the panel, there is a section titled "NEED SOME HELP WITH THIS TASK?" with two buttons: "Done & Talk" and "Done".

# One Million Satellite Matches (2017-2022)

- Up to 947,000+ satellite matches.
- One Million matches possible by mid July 2022.

## Updates:

April 2022, the team led a modernization of satellite data matching code.

- Hourly FLASHFlux SSF data
- Extended matching window +/- 15:59.9 and can now extend to next day  
(example: 1/1/2022 23:50 – 1/2/2022 00:05 UTC)

